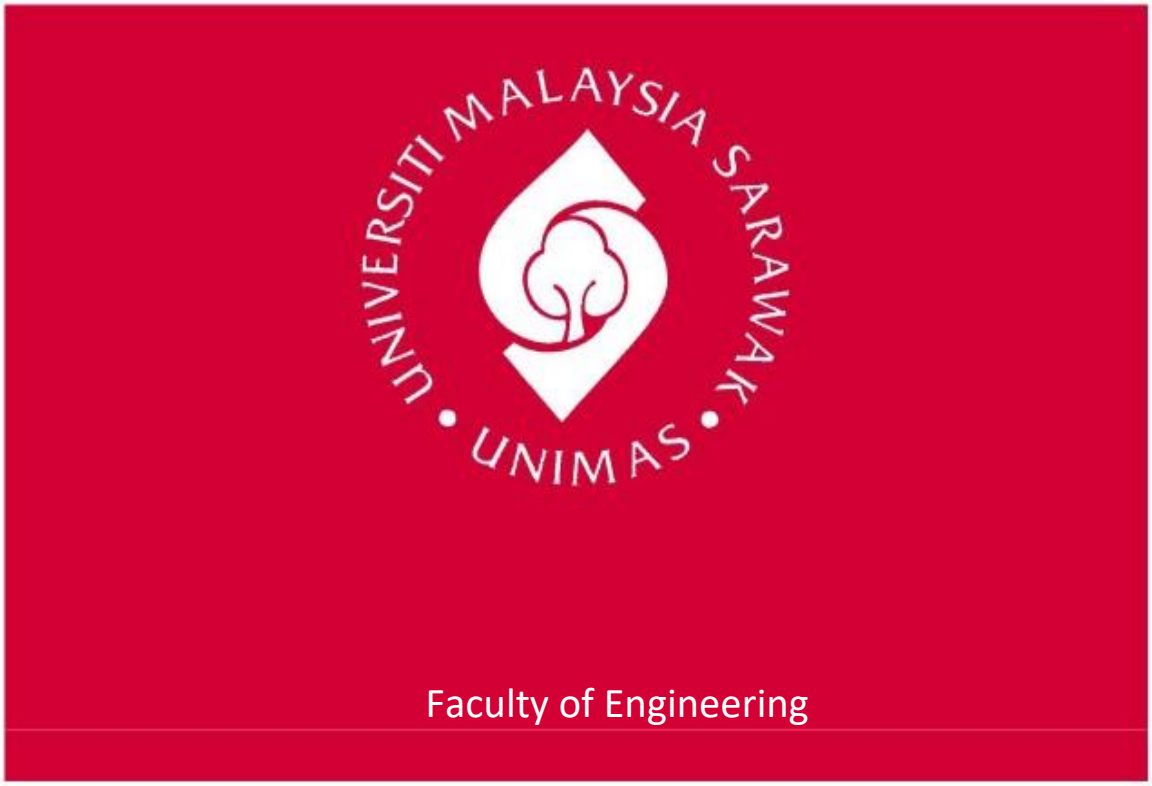

STUDY AND DESIGN OF AUTOMATED FISH POND MONITORING SYSTEM USING LABVIEW AND DATA ACQUISITION DEVICE

Catherine Anak Encharang

Bachelor of Engineering (Hons)

Electrical and Electronics Engineering

2019

UNIVERSITI MALAYSIA SARAWAK

Grade: A

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Final Year Project Report ☑

Masters ☐

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Senior Lecturer
Department of Electrical and Electronic Engineering
Faculty of Engineering
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Senior Lecturer
Department of Electrical and Electronic Engineering
Faculty of Engineering
University Malaysia Sarawak (UNIMAS)

Supervisor signature: _____ 11/6/2019
(Date)

Current Address:
1201, TAMAN PARK VIEW, LORONG STAPOK SELATAN 6, JALAN STAPOK BATU KAWA, 93250 KUCHING, SARAWAK

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STUDY AND DESIGN OF AUTOMATED FISH POND MONITORING SYSTEM USING LABVIEW AND DATA ACQUISITION DEVICE

CATHERINE ANAK ENCHARANG

A final year project report submitted in partial fulfilment of
the requirement for the degree of
Bachelor of Engineering (Hons) Electrical and Electronics Engineering

Faculty of Engineering
University Malaysia Sarawak

2019

To my beloved family and friends

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ABSTRACT

Fish farming is a fast growing industry as there is an increasing demand for fish as food and income. It involves the raising of fish commercially in fish pond. Malaysia has been doing traditional way to monitor the fish in fish farming. It caused inconvenience to the user as the data gained may be inaccurate. Technology based system is developed to monitor fish condition in fish pond. LabVIEW and Data Acquisition device such as NI USB 6001 are the most important tools for the project. Sensors, water pump and fish feeding machine are connected to the NI USB 6001 and the data are shown on the laptop screen. Each reading has its own range for the optimal condition of fish. The water level, fish pellets level and temperature were ranged from 19 cm to 21 cm, 3 cm to 10 cm and 27 °C to 30 °C respectively. The readings detected by the sensors are sent to the NI USB 6001 and shown on the laptop screen. Two water pumps are used. Each water pump is operated when the temperature or water level are out of range by sending signal to the water pump to switch on. The DC motor in fish feeding machine is operated based on the time setting in LabVIEW. Based on the result, temperature sensor and water level sensor showed good signs, alarm and water pumps were not operated when they were in range while out of range showed bad signs, alarm and water pumps were operated. Fish pellets level monitoring system has the same condition except that it did not operate water pump. The feeding monitoring system only operates the fish feeding machine when 4 hours had elapsed and off when 10 seconds had elapsed. This project was able to ease the fish farmer's daily life and decrease the fish mortality problem.

ABSTRAK

Pertanian ikan adalah industri yang berkembang pesat disebabkan oleh peningkatan permintaan ikan sebagai makanan dan pendapatan. Hal ini melibatkan penangkapan ikan secara komersil untuk kolam ikan. Malaysia telah melakukan cara tradisional untuk memantau ikan dalam penternakan ikan. Hal sedemikian telah menyebabkan kesulitan kepada pengguna kerana data yang diperolehi berkemungkinan tidak tepat. Sistem berasaskan teknologi telah dibangunkan untuk memantau keadaan ikan di kolam ikan. LabVIEW dan peranti pemerolehan data seperti NI USB 6001 adalah alat yang paling penting untuk projek ini. Sensor, pam air dan mesin pemakanan ikan telah disambungkan ke NI USB 6001 dan data dipantau melalui skrin komputer riba. Setiap bacaan mempunyai had tertentu untuk keadaan optimum ikan. Tahap air, kadar pelet ikan dan suhu adalah dari 19 cm hingga 21 cm, 3 cm hingga 10 cm dan 27 ° C hingga 30 ° C. Bacaan yang dikesan oleh sensor dihantar ke NI USB 6001 dan ditunjukkan pada skrin komputer riba. Dua pam air telah diguna. Pam air beroperasi apabila suhu atau paras air berada di luar jangkaan dengan menghantar isyarat ke pam air untuk menghidupkannya. Motor DC dalam mesin pemakanan ikan beroperasi berdasarkan masa yang ditetapkan dalam LabVIEW. Berdasarkan keputusan projek, sensor suhu dan sensor paras air menunjukkan tanda-tanda yang baik, penggera dan pam air tidak beroperasi apabila mereka berada dalam julat manakala di luar jangkauan, tanda-tanda buruk telah ditunjukkan, penggera dan pam air beroperasi. Sistem Pemantauan paras pelet ikan mempunyai keadaan yang sama kecuali pam air tidak digunakan. Sistem pemantauan makan hanya mengoperasi mesin pemakanan ikan apabila 4 jam telah berlalu dan tutup apabila 10 saat telah berlalu. Projek ini mampu meringankan kehidupan seharian petani ikan dan mengurangkan masalah kematian ikan.

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A	-	Ampere
B	-	Beta constant
C	-	Celsius
cm	-	Centimetres
g	-	Gram
GHz	-	Gigahertz
Hz	-	Hertz
K	-	Kelvin
kHz	-	Kilohertz
kΩ	-	Kiloohm
mA	-	Milliampere
mAh	-	Milliampere hour
mm	-	Millimetre
Mpa	-	Mega Pascal
mV	-	Millivolt
pH	-	Potential of hydrogen
s	-	Second
V	-	Voltage
W	-	Watts
°C	-	Degree Celsius

LISTS OF ABBREVIATION

AI0+	-	Analogue Input 0
AI1+	-	Analogue Input 1
AI3+	-	Analogue Input 3
AO	-	Analogue Output
CCTV	-	Closed-circuit Television
DAQ	-	Data Acquisition Device
DC	-	Direct Current
DIO	-	Digital Input/Output
GCM	-	Google Cloud Messaging
GND	-	Ground
GSM	-	Global System for Mobile communications
I/O	-	Input / Output
IDE	-	Integrated Development Environment
IN1	-	Input 1
IN2	-	Input 2
IN3	-	Input 3
IoT	-	Internet of Things
IP	-	Internet Protocol
IR	-	Infrared
LabVIEW	-	Laboratory Virtual Instrument Engineering Workbench
LCD	-	Liquid Crystal Display